Late Neoproterozoic (Pan-African) reactivations in the Mesoproterozoic Karagwe-Ankole Belt (KAB) in Kivu (RDC), Rwanda and Burundi: chronological framework and paleostress field.

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The Karagwe-Ankole Belt (KAB) in the Kivus of the Democratic Republic of the Congo (DRC), Rwanda and Burundi is generally considered as a Mesoproterozoic belt, with a geodynamic evolution governed by the 1375 Ma Kibaran magmatic event, the ± 1.0 Ga Rodinia and the ± 550 Ma Gondwana (Pan-African) amalgamation events (Tack et al., 2010). Here we focus on the ± 550 Ma Gondwana event, which has been generally underestimated in previous works. This last event was first detected by "anomalously" young ages interpreted as isotopic rehomogenisations of "Lufilian" age in the granites of Rwanda, including the ± 980 Ma Tin granites which have been frequently cataclased (Gerards and Ledent (1970). Similar ages were obtained also for Pb/Pb, Rb/Sr on microcline from pegmatites (Monteyne-Poulaert, 1962), U/Pb on hydrothermal muscovite (Walemba, 2001) and U/Pb on monazite in a tectonic breccia in Burundi (Brinckmann et al., 2001).

We compiled the existing chronological datasets for the Karagwe-Ankole belt from the Paleoproterozoic to the late Cenozoic rifting. It evidences a multistage evolution (magmatism, mineralization, sedimentation, metamorphism, ductile and brittle deformation) and, in particular, the importance of Pan-African reactivations. In parallel, recent work in the neighboring areas (e.g. in Tanzania, Uganda and Kenya) showed that East-Central Africa appears much more unstable than previously thought as a consequence of the east Gondwana amalgamation. Fritz et al. (2013) evidenced early Pan-African formation of the East African Orogen between 650 and 615 Ma due to the collision and closure of the Mozambique ocean. Further E-W convergence occurred between 590 and 570 Ma (Fritz et al., 2013; Saalmann et al., 2016), together with interaction between the Tanzania Craton and the Bangweulu Block between 590 and 550 Ma (Boniface & Appel, 2018). Late Pan-African reactivations under E-W shortening were caused by the Tanzania–Congo / Dharwar Cratons convergence at about 530 Ma (Fritz et al. 2013).

Field observations at various sectors of the KAB belt evidence brittle faulting that appear unrelated to and younger than the previous "Kibaran" magmatic, deformation and mineralization events (1.375 Ga or ~1.0 Ga), but contemporaneous with the deformation of the Neoproterozoic (Cryogenian-Ediacaran) Itombwe series. Paleostress inversion allowed to reconstruct an older and widely expressed tectonic stress field characterized by a general E-W horizontal compression in a strike-slip to thrust faulting regime, and a younger brittle reactivation under N-S horizontal compression. The first brittle event occurred in brittle-ductile conditions and is interpreted as related to the late Pan-African event that affected the entire belt. The second brittle event is restricted to a few area and whiteness younger deformations. This finding opens important perspectives for a revision of the regional geological map and also for the better understanding of the mineral resources.

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